

EVERGREEN ACRES SUBDIVISION (PWS 6030015) SOURCE WATER ASSESSMENT FINAL REPORT

November 1, 2000



State of Idaho Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for the Evergreen Acres Subdivision* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Evergreen Acres Subdivision consists of two well sources located approximately 300 feet apart that are manifolded together before distribution. There exists limited knowledge concerning well design, the aquifer in which these wells are completed, and ground water source area.

Total coliform bacteria were detected in the water sampling efforts of November 1998. The potential sources of contamination within the delineation capture zones include a municipal wastewater discharge site, five underground storage tank sites, one wastewater land application site, and four mining operation sites (only one mine remains active). The final well ranking was high for volatile organic contaminants and moderate for inorganic contaminants, synthetic volatile contaminants, and microbial contaminants.

For the Evergreen Acres Subdivision, source water protection activities should focus on implementation of practices aimed at keeping the distribution system free of microbial contaminants. Disinfection should be considered if microbial problems arise and/or persist. The water system should also focus on improving the wellhead protection strategy. A 1998 sanitary survey disapproved the well because of no well vent was installed on the wellhead. Fixing this problem will improve the system construction score and lower the potential for contamination. Land uses within most of the source water assessment area are beyond the control of the water system. Therefore, partnerships with state and local agencies should be established to ensure future land uses are protective of ground water quality. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission and Portneuf Soil and Water Conservation District, and the Natural Resources Conservation Service.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR EVERGREEN ACRES SUBDIVISION, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

Evergreen Acres Subdivision is a community public drinking water system serving approximately 30 persons. The water system is located approximately two miles west of the City of Inkom in Bannock County (Figure 1). Residents receive their water from two well sources that are manifolded together before distribution. At this time, there appears to be no primary water quality issues facing the water system. However, the presence of retail gasoline stations in the three-year time of travel zone could pose an imminent threat to the water system in the event of a petroleum release that impacts ground water.

Defining the Zones of Contribution--Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. Dr. John Welhan of the Idaho Geological Survey used analytical computer models approved by the EPA to determine the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time of travel zones for wells where sufficient information on aquifer properties was available.

In situations where insufficient information was available, the capture zones were delineated using a modified calculated fixed radius method. This method utilized assumed aquifer parameters for the major aquifer types in Idaho (Appendix F, Idaho Wellhead Protection Plan), in combination with well-specific information where available, such as well discharge rate and estimates of local hydraulic gradient. This information was used in an analytical model to calculate the radial time-of-travel distances for capture zone areas represented by fixed radii.

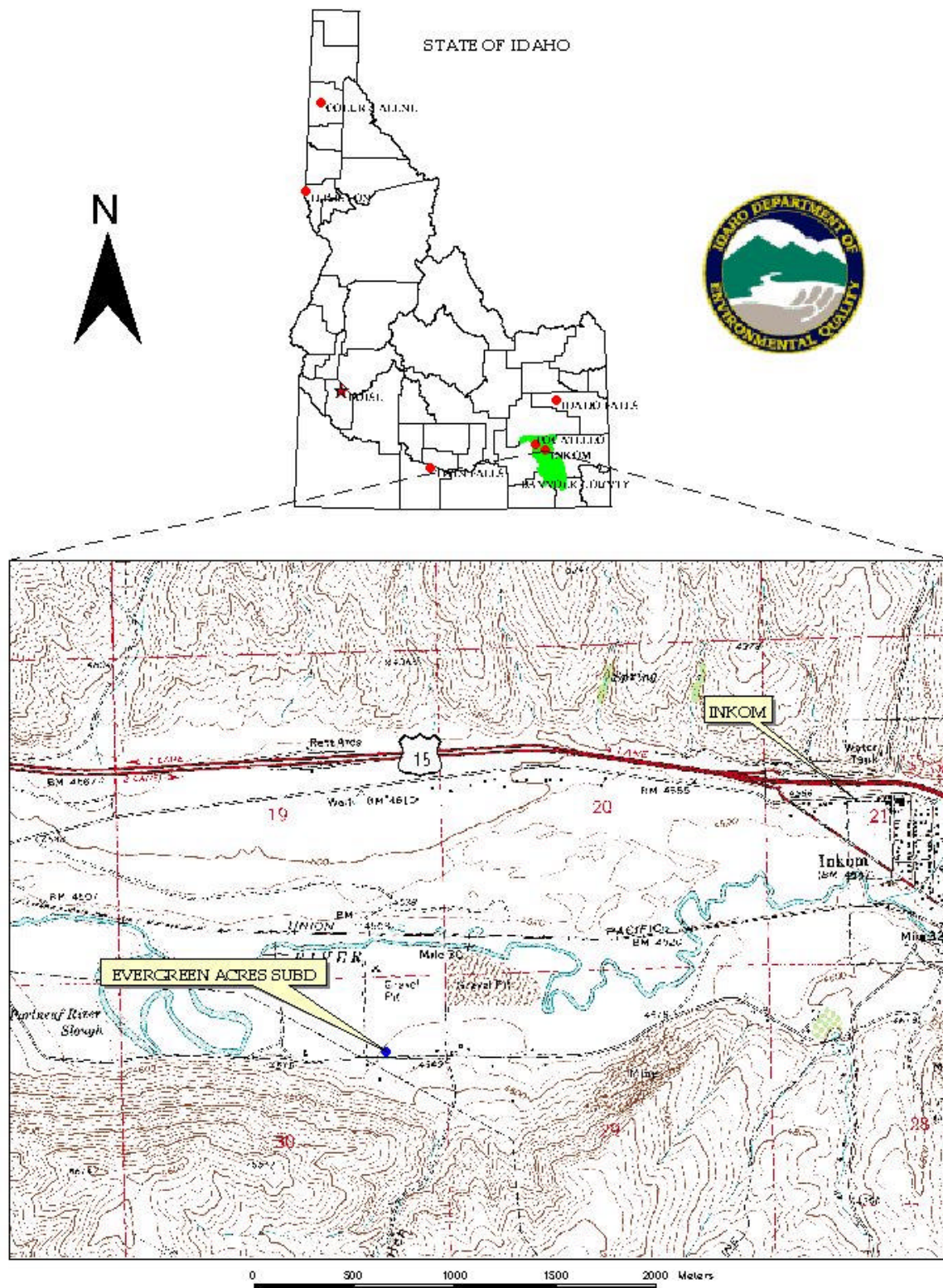
In either case, well-specific information was derived from a variety of sources including sanitary surveys, local well logs, and operator records. The actual data used by Dr. Welhan in determining the zones of contribution are available upon request.

In some cases where the general source area or ambient direction of ground water flow for a well was unknown or could reasonably be assumed to be from two different directions and/or aquifer types, the zones of contribution were calculated for two different cases and both were mapped. For the Evergreen well, it is not known whether ground water originates from the highly permeable Bonneville gravels or the much less permeable colluvial (rocks and/or soils accumulated at the foot of a slope) and bedrock aquifers which are adjacent, and tributary, to the Bonneville gravels. Thus it is unknown whether this well draws water primarily from tributary valley underflow or from the main Bonneville gravel aquifer to the east, along the Inkom valley. In the latter case, sufficient reliable information on the aquifer was available to define zones of contribution with an analytical model. In the former case, assumed aquifer permeability values and maximum possible hydraulic gradients were assigned and a modified calculated fixed radius method was used to define semicircular zones of contribution.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

FIGURE 1 - GEOGRAPHIC LOCATION OF EVERGREEN ACRES SUBD



It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A contaminant inventory of the study area was conducted during the spring and summer of 2000. This involved identifying and documenting potential contaminant sources within the Evergreen Acres Subdivision Source Water Assessment Area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ.

The Evergreen Acres Subdivision Source Water Assessment Area has eight potential contaminant sites within the delineated source water areas. These potential sources of contamination include underground storage tank sites, a municipal wastewater discharge site, wastewater land application site, and a mining operation (Table 1). The resource that is currently being mined is limestone. The dominant land use to the south of Evergreen Acres Subdivision is mountainous terrain. The land use to the north, east, and west are primarily urban development. Contaminants of concern are primarily business chemicals such as petroleum products. Table 1 lists the potential contaminants of concern, time of travel zones, and information source.

Table 1. Evergreen Acres Subdivision, Potential Contaminant Inventory

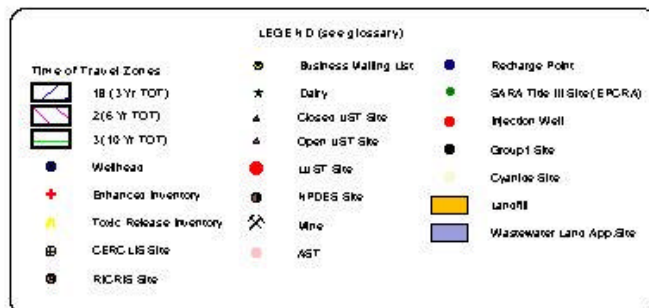
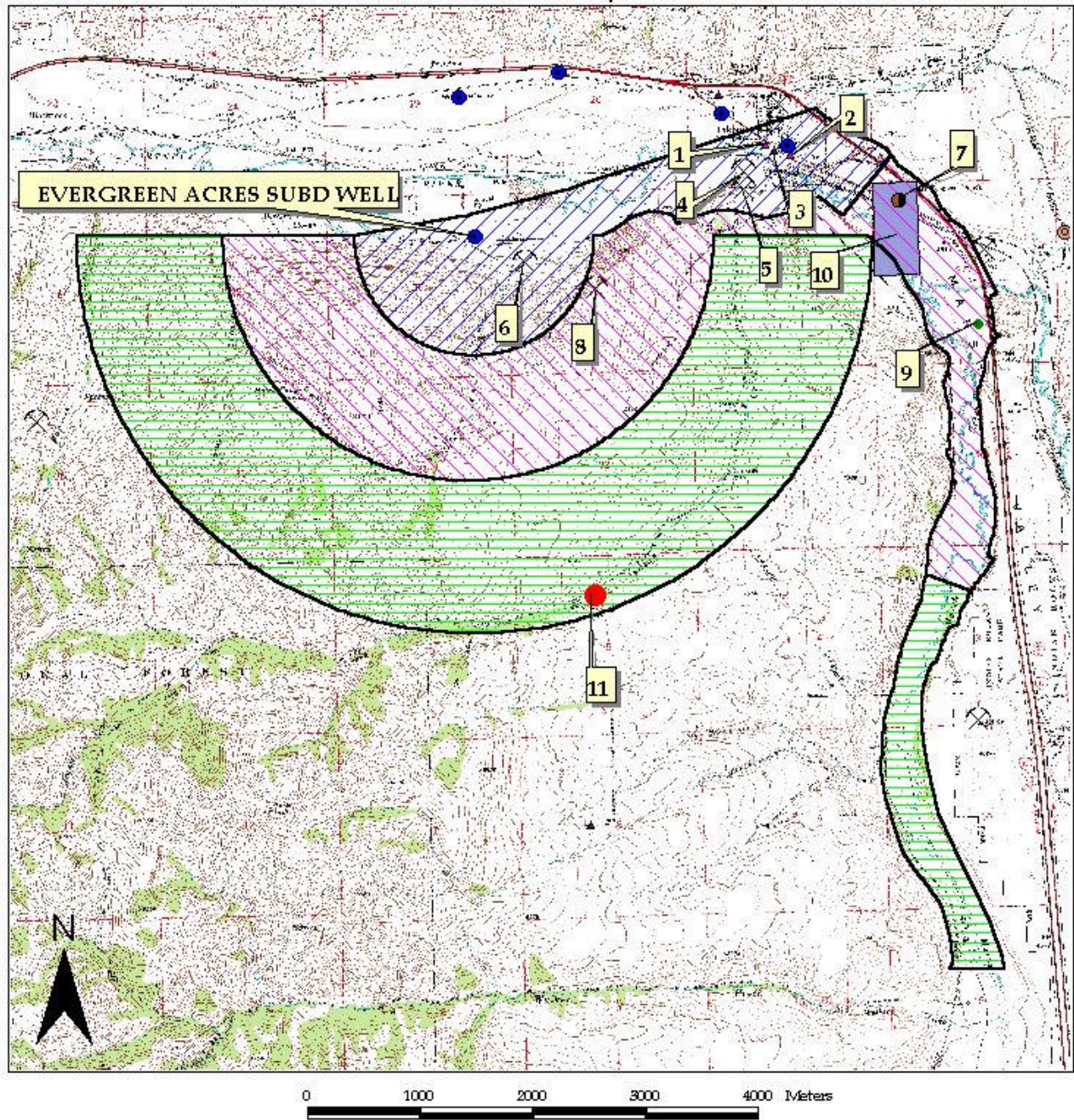
SITE #	Source Description	TOT Zone (years)	Source of Information	Potential Contaminants
1	Former UST site	0-3	Database Inventory	VOC, SOC
2	UST site	0-3	Database Inventory	VOC, SOC
3	Former UST site	0-3	Database Inventory	VOC, SOC
4	Mine	0-3	Database Inventory	VOC, SOC
5	Mine	0-3	Database Inventory	VOC, SOC
6	Mine	0-3	Database Inventory	VOC, SOC
7	Municipal Wastewater Discharge	3-6	Database Inventory	IOC
8	Mine	3-6	Database Inventory	VOC, SOC
9	Land Application site	3-6	Database Inventory	IOC
10	Former LUST site	6-10	Database Inventory	VOC, SOC
11	Former UST site	6-10	Database Inventory	VOC, SOC

TOT = time of travel (in years) for a potential contaminant to reach the wellhead

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

UST = underground storage tank

FIGURE 2 - EVERGREEN ACRES SUBD: Delineation Map and Potential Contaminant Source Location



PWS 6030015
WELL

Section 3. Susceptibility Analyses

The susceptibility of the wells to contamination were ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity was rated moderate for the two well sources (see Table 2). The soils in the delineations are considered to be in the poor to moderate drainage class. No well log data was available to determine the make up of the vadose zone (zone from land surface to the water table). Furthermore, there is no information to determine if 50 feet of low permeability units are present between the surface and the water producing zone of the aquifer.

Well Construction

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. Lower scores imply a system that can better protect the water. The well system construction rating is moderate for the group well sources (Table 2). Though no well logs are available, the sanitary survey report indicates both wells have 10-inch diameter casing. The report also shows that the wellhead seals are in good condition, however, the west well does not have a casing vent.

The wells were given an additional point (no well log available) because it could not be determined if they meets current well construction standards. The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems (PWSs) to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Various aspects of the standards can be assessed from well logs. Table 1 of the *Recommended Standards for Water Works (1997)* states that 10-inch steel casing requires a thickness of 0.365 inches instead of the presumed 0.250-inch thickness of the wells. The standards state that screen will be installed and have openings based on sieve analysis of the formation. Standard 3.2.4.1 requires all PWSs to have yield and drawdown tests that last “24 hours or until stabilized drawdown has continued for six hours at 1.5 times the design pumping rate” (Recommended Standards for Water Works, 1997).

Potential Contaminant Source and Land Use

The wells rated low for inorganic contaminants (IOCs) (i.e. barium, nitrate, sodium) and microbial contaminants, moderate for synthetic organic chemicals (SOCs) (i.e. pesticides), and high for volatile organic chemicals (VOCs) (i.e. petroleum products). Total coliform bacteria were detected in the water sampling efforts of November 1998. Nitrates were also detected in the water sampling efforts of December 1998 (2.5 mg/L) and November 1999 (2.4 mg/L).

Final Susceptibility Rating

A detection above a drinking water standard Maximum Contaminant Level (MCL), any detection of a VOC or SOC, or a detection of total coliform or fecal coliform will automatically give a high susceptibility rating to the final well ranking despite the land use of the area because a pathway for contamination already exists. In this case, the final well rankings were high for VOC contaminants and moderate for IOCs, SOCs and microbial contaminants.

Table 2. Summary of Evergreen Acres Subdivision Susceptibility Evaluation

Well	Susceptibility Scores									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
1&2	M	L	H	M	L	H	M	H	M	M

H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

DEQ records indicate no detection of a VOC or SOC contaminant in the drinking water. The wells rated high for VOCs because of several petroleum fuel storage tanks located in the delineated capture zones. The moderate rating for the VOCs is attributed to the underground storage tanks located in the three-year time of travel zone

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the Evergreen Acres Subdivision, source water protection activities should focus on implementation of practices aimed at keeping the distribution system free of microbial contaminants. Disinfection should be considered if microbial problems arise and/or persist. The water system should also focus on improving the wellhead protection strategy. A 1998 sanitary survey disapproved the well because of no well vent was installed on the wellhead. Fixing this problem will improve the system construction score and lower the potential for contamination. Land uses within most of the source water assessment area are beyond the control of the water system. Therefore, partnerships with state and local agencies should be established to ensure future land uses are protective of ground water

quality. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office (208) 236-6160

State DEQ Office (208) 373-0502

Website: <http://www2.state.id.us/deq>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with wellhead protection strategies.

Potential Contaminant Inventory List of Acronyms and Definitions

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as “Superfund” is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (IDEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by IDEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environment Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Environmental Quality. 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Southeastern District Health Department. 1998. *Evergreen Acres Sanitary Survey Report*

Welhan, J. 2000. Idaho Geologic Survey. *SWA Capture Zone Delineations, Lower Portneuf and Marsh Valleys*

Attachment A

Evergreen Acres Subdivision Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

1. System Construction		SCORE			
Drill Date	NO				
Driller Log Available	YES	1998			
Sanitary Survey (if yes, indicate date of last survey)	NO	1			
Well meets IDWR construction standards	YES	0			
Wellhead and surface seal maintained	NO	2			
Casing and annular seal extend to low permeability unit	NO	1			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain					
Total System Construction Score		5			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		4			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	0	6	6	0
(Score = # Sources X 2) 8 Points Maximum		0	8	8	0
Sources of Class II or III leacheable contaminants or	YES	2	6	0	
4 Points Maximum		2	4	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B 25 to 50% Irrigated Agricultural Land		2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		4	14	10	2
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	0	
Land Use Zone II 25 to 50% Irrigated Agricultural Land		1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	0	1	1	
Sources of Class II or III leacheable contaminants or	YES	0	1	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	2	1	0
Cumulative Potential Contaminant / Land Use Score		9	21	15	3
4. Final Susceptibility Source Score		11	13	12	10
5. Final Well Ranking		Moderate	High	Moderate	Moderate